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The Tool Engineer

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January

1936

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Official Publication of the

AMERICAN SOCIETY OF TOOL ENGINEERS

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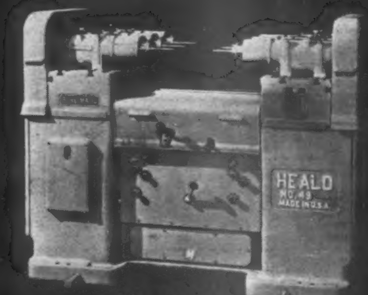

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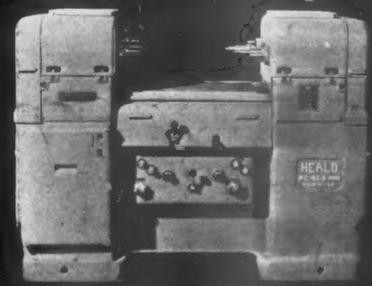
No. 47A Large Single End Bore-Matic



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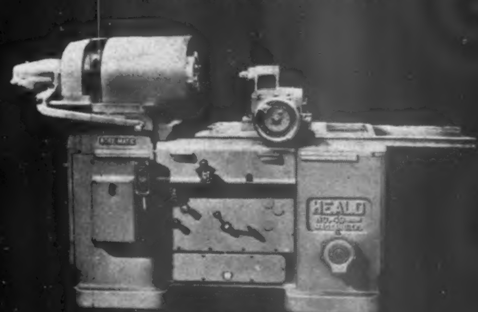

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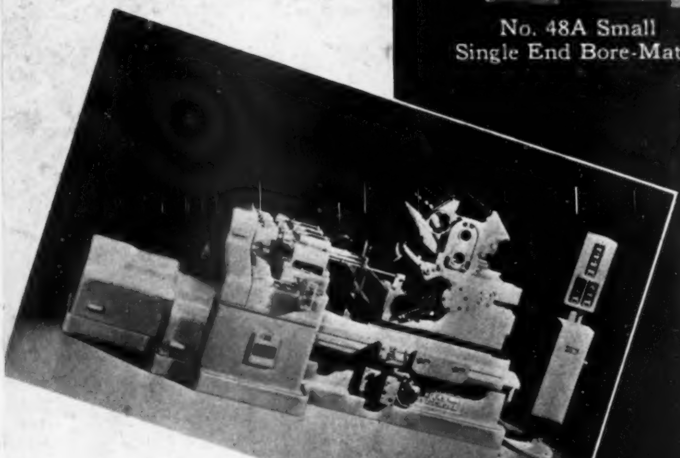

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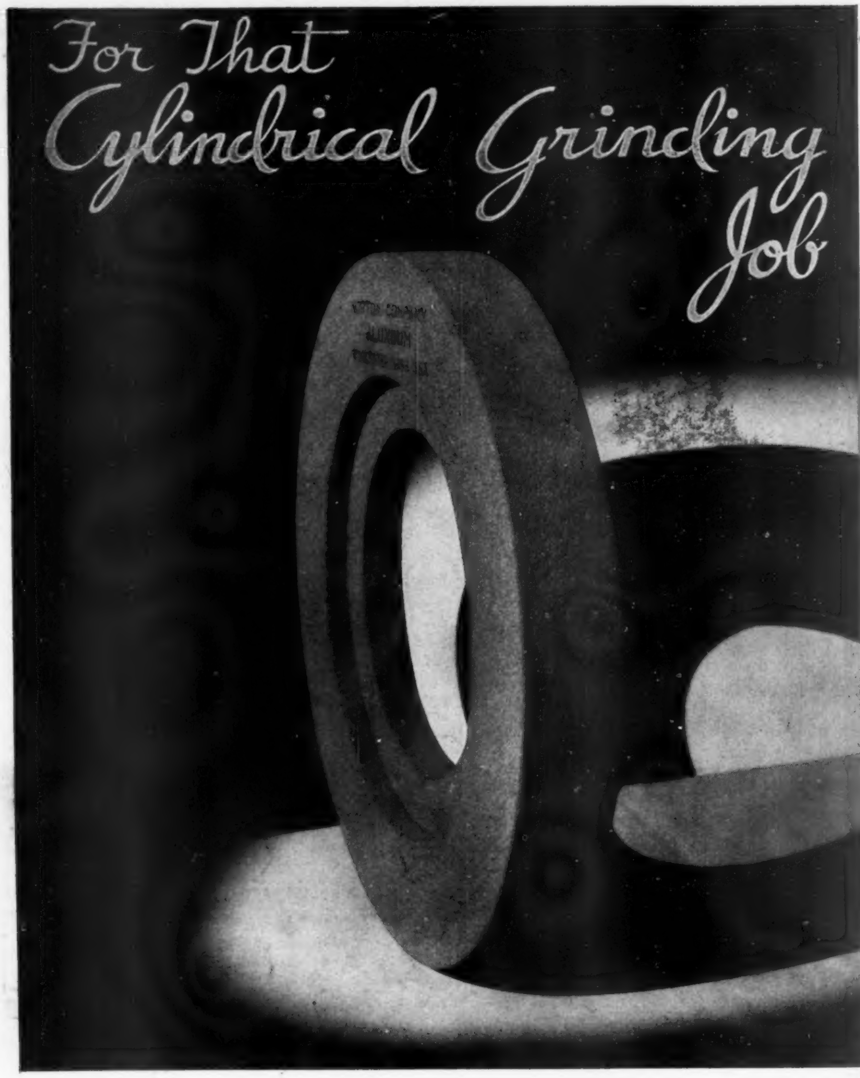

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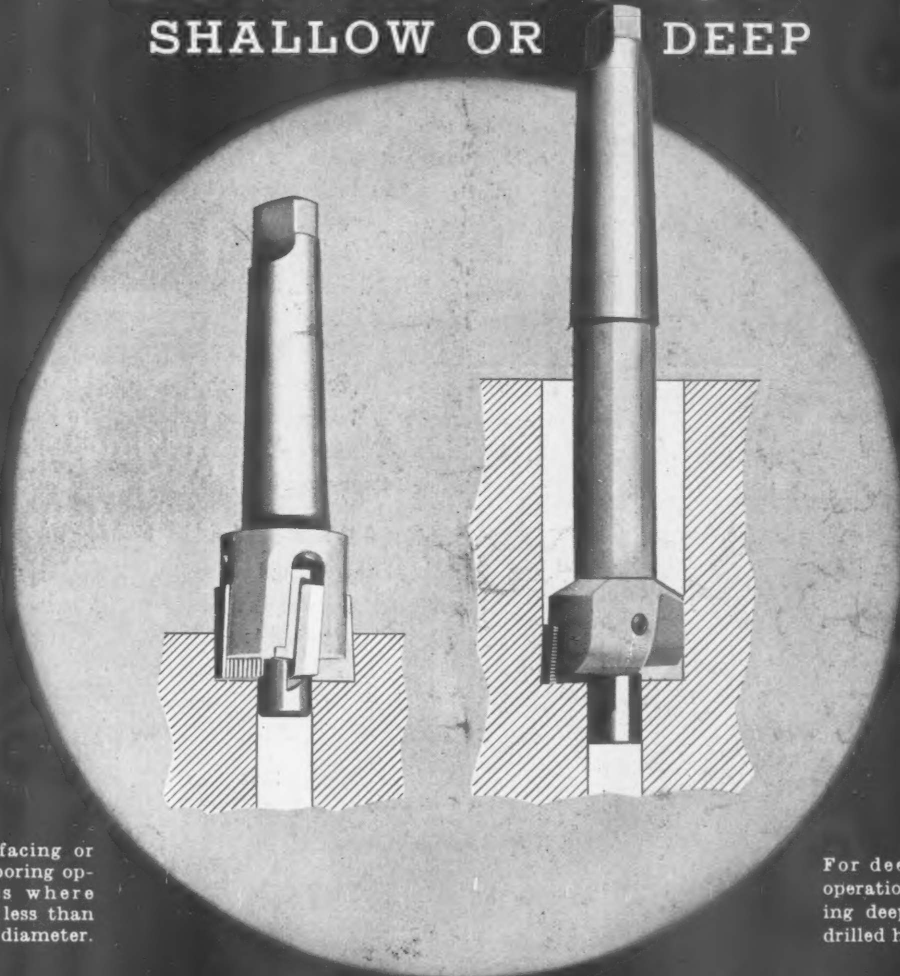

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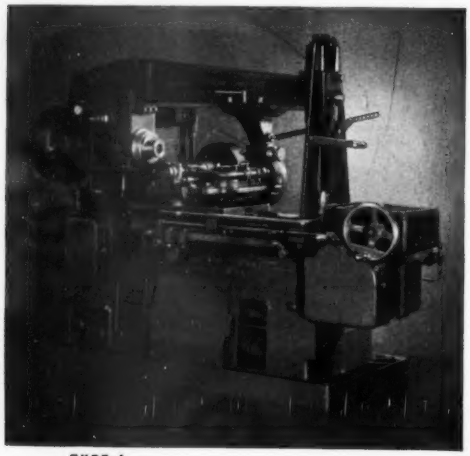

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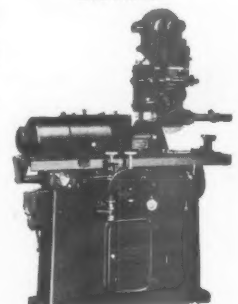
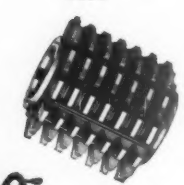


HOBS



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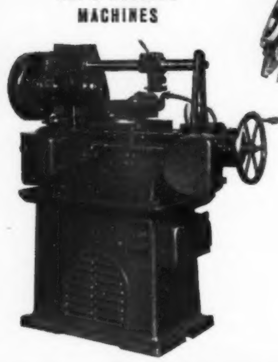
MACHINES



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Official Publication of the AMERICAN SOCIETY OF TOOL ENGINEERS

Vol. IV. JANUARY, 1936 No. 9

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The Tool Engineer is published on the first Thursday of each month. It is the official publication of the American Society of Tool Engineers, Incorporated. The membership of the Society and readers of this publication are practical manufacturing executives such as master mechanics, works managers, tool engineers, tool designers and others who are responsible for production in mass manufacturing plants throughthe nation and in some foreign countries.
Owing to the nature of the American Society of Tool Engineers organization, it cannot, nor can the publishers be responsible for statements appearing in this publication either as papers presented at its meetings or the discussion of such papers printed herein.

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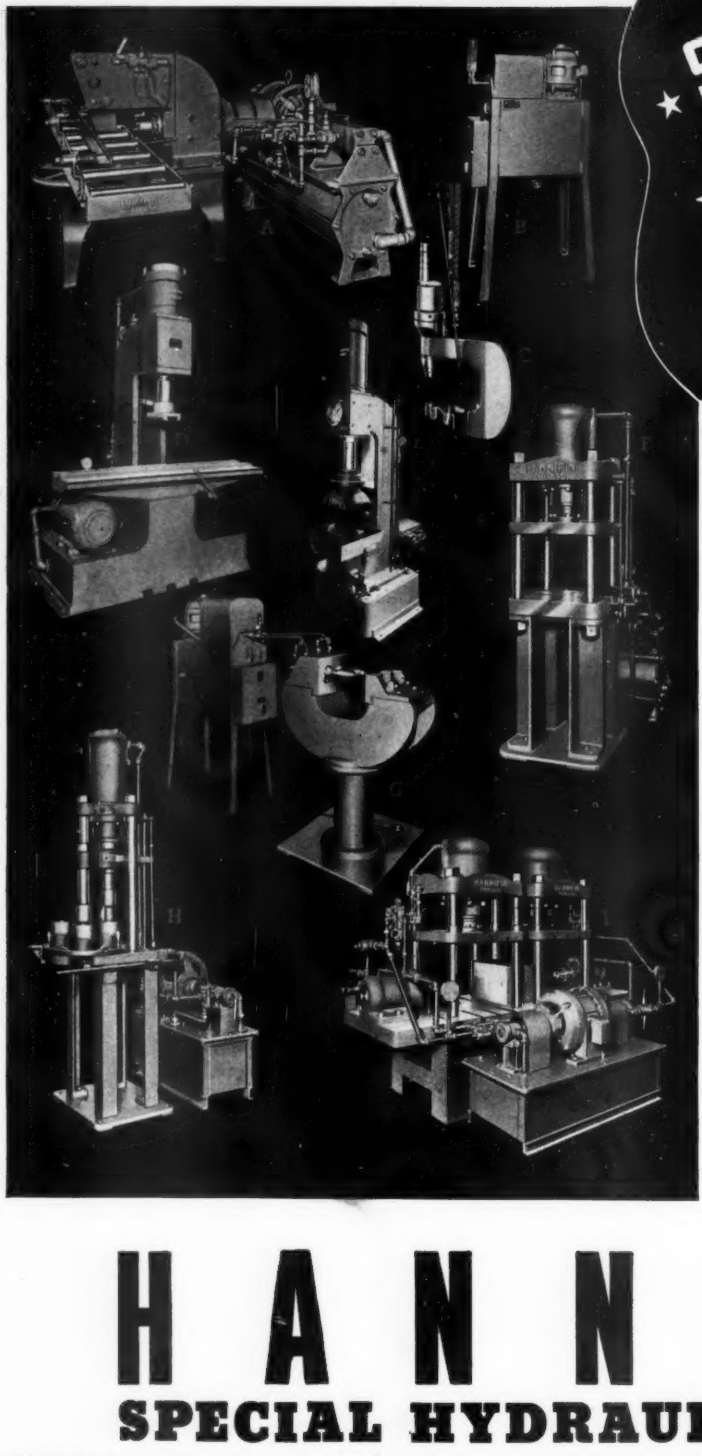

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JANUARY MEETING

DETROIT

January 9th, 1936

HOTEL FORT SHELBY—BALL ROOM

Dinner: 6:30 p. m.*

Technical Session: 8:00 p. m.

****A program of entertainment and music has been provided for dinner guests.***

☆ ***Speaker:*** **W. S. Knudsen, Executive Vice President, General Motors Corporation** ☆
Subject: **The Importance of Tool Engineering to the Automotive Industry**

One of the nation's leading manufacturing executives comes to us, on this occasion, to present his impressions of our relative position and importance in the mass manufacturing world of today. No doubt, Mr. Knudsen's views on this subject may well be taken as indicative of the conception held by the country's industrial leaders of Tool Engineering as a profession.

☆ **Only those making reservations immediately can be assured of dinner places. Every effort will be made to accommodate those who wish to attend the technical session only.** ☆

PRODUCTION PERSPECTIVES

• • •

As we begin another year let us review what took place in the Tool Engineers' world in the year now past. First, let us be grateful that most of us have had steady employment throughout the year—many of us, at times, from 10 to 12 or even 14 hours a day—during "programs." Tool Designers, generally, were busy. Mass manufacturing throughout the nation received a considerable impetus in '35. Many mass manufactured products such as automobiles, household appliances, radios and other common conveniences of the times had worn out or become so obsolete that they had virtually outlived their usefulness, all of which contributed to increasing markets. During '35 much progress was also made toward balancing production throughout the year—notably the automotive industry which has changed the time of introducing new models. This has had the salutary effect of avoiding much last minute confusion and spreading employment more nearly throughout the year, rather than the usual seasonal rush and overtime for production executives and tool men. This plan as far as the automotive industry is concerned appears to have been satisfactory to management for in Detroit, these days, it is definitely known that **several large "programs" will be released sooner** this year than usual.

In the new year, there are reasons for a more confident outlook. New plants, new equipment, new methods and processes are apparent in different sections of the country. This all means work and more work for production executives and business for the major machine tool industry, now rapidly coming into its own. An example is the **branch plant** at **Muskegon** of the **Hercules Motor Corporation.** This company sometime ago took over the plant at Muskegon formerly occupied by the Clark Sanding Machine Company. For a month or more Pioneer Engineering & Manufacturing Company have had between 30 and 40 designers busy—designing tools, jigs, fixtures, machine attachments, gages, etc., for use in this Muskegon plant. **Machinery** and **new equipment** we understand is already **being placed** so that **production** may **begin as soon as possible.**

Columbus, Indiana is another busy place with **Cummins Engine Company** reported very busy. Employees have experienced difficulty in finding living quarters—many "commuting" the forty miles to Indianapolis.

Noblitt-Sparks Industries, Inc., with plants at Columbus, Seymour, Franklin and Greenwood recently announced wage rate increases of approximately 5 to 7½ per cent affecting all hourly rate employees. On the basis of present pay rolls the increase should mean an additional distribution of wages of approximately $100,000 a year.

In a program of expansion the company has also constructed a new factory building at Franklin, new all-steel shelters for storage of finished products, and new equipment and other improvements in its other plants at Seymour and Columbus.

Recent merger of the Bantam Ball Bearing Company at South Bend with the $11,000,000 Torrington Company, at Torrington, Conn., brings together two of the world's largest bearing manufacturing companies. Karl L. Herrmann, general manager of the Bantam Company will remain in that capacity.

Wide-spread use of a new safety device for automobiles—a brake press-o-meter, designed by engineers of the Bendix Products Corporation, South Bend and now in production, is anticipated.

The meter, which weighs only eight pounds, is said to measure accurately the amount of pressure required to apply full braking power to an automobile. The ease with which the meter can be attached and read are other features pointed out.

The Arup "flying wing" airplane, completed and tested at South Bend some time ago, attracted much attention during a visit at Stout field, Indianapolis airport. Framework of the ship is constructed of seamless metal tubing. The Arup is powered with a 70-horse power LeBlond five-cylinder radial, air-cooled engine, and has dual controls side by side in the two-place inclosed cabin. The plane has no spin characteristics and when it reaches stalling speed it floats slowly down, almost level, it is said.

In the past year A.S.T.E. has shown much activity and progress. Membership has grown steadily, new chapters of the organization were added at Racine, Wisconsin and at Cleveland, Ohio. More and more the practical men responsible for production, are realizing the need for and the place that the American Society of Tool Engineers is filling in their interest and advancement. In 1936 many more new chapters are expected, thus extending the scope and value of the organization to the thousands of Tool Engineers who need and want the benefits of this group devoted to their specific needs. The participation of A.S.T.E. in the Machine Tool Congress at Cleveland in September the past year was a note-worthy event in the brief history of this young Society. The issuance of the A.S.T.E. Standard Tool Engineering Data Sheets was another very worthwhile activity. Many more of these valuable data sheets will be issued from time to time.

The Relationship of Processing to the Control of Costs

By E. H. JOHNSON
Supt. Standards, Packard Motor Car Co.

As given before Detroit Meeting of the American Society of Tool Engineers, December 12th, 1935

The speaker was introduced by Mr. George Christopher, Executive Vice President of the Packard Motor Car Company. His introduction follows:

Mr. Christopher: Thank you Mr. Carpenter, Members of the American Society of Tool Engineers, and machine tool salesmen: The first act in which the drunk man fell down in the act was not of much concern to the fellows putting on the program because they had a couple of substitutes in the audience so, if I had to name those fellows, I probably could. If it was forced on me, I would say it was Harper and Charlie Barn. Of course, in a meeting of the proportion you have tonight, there probably will be something that is going to go wrong. There is something that goes native on you and makes you think of the shop. As usual, we would have to have some production executives. If you would blow the whistle, you would lose two right now.

Well, we want to get down to the talk that you came down here to hear and they asked me to introduce your speaker. I have had the responsibility of introducing my boss and I now have the responsibility of introducing the man who works for me. In either one of those cases you have to be very careful about the truth because it is a reflection on you. Probably, in talking about a Standards department in different organizations, it varies quite a bit in what their duties are. I have never been quite able to understand what our standards of shop has been able to do. If your speaker gets away with it, it will be information to me too. There is one thing sure; you are responsible for him being in the organization. That limits me to saying good things about the speaker, rather than telling you just what I could. Now, the fact that he is on the job would make me believe he is qualified. Now, the background—a qualification of a good standards man, if any of you are thinking of becoming one; you must or better look up your family tree before you start. It is a real good training if you have what this man has. This man received his training at Studebaker, when they were making wagons and that is where he got the refinement of his trade. He has been able to take up some of the rudiments of the automobile production. That is the first training you have got to get in; something active, like wagon building. You really have to be a fellow that has come up in a big family. He must come from a big, poor family, where he has to fight with all the rest of the family to get anything. That is part of the training of a standards man. I am not so sure but what your speaker tonight was overtrained. I would like to introduce Eddie Johnson, our man in charge of standards.

Mr. Johnson:

In the discussion of processing it is, of course, necessary that a clear definition of the term be made. Processing is defined as—"An operation or a number of operations leading to some result." The results to be expected from a process are: 1. Quality; 2. Quantity; 3. Economy; 4. Cleanliness; 5. Safety. Process is one of the fundamentals of every one's existence. People are constantly striving to do something whether they be the most savage of aborigines or the most successful leaders of men. Man's every action is governed by these five facts: What, How, Why, Where, When. When we consider the function of processing we are still governed by these five facts.

What is "Quality"? Is it something elusive and subject to various individual opinions, or has it a definite measurement? Quality is defined as: "Exact measurement and sameness with reference to given specifications." Quality demands a process which will consistently maintain and improve these requirements to such an extent as to assure exact sameness within or better than the specifications. "Quantity" denotes the result measured in reference to a fixed standard. Processing for quantity demands an accurate measurement of the productivity of the operation. A fixed standard should always take into consideration machine and tool troubles and operator's personal needs. It must be representative of average conditions and should constitute an agreement between all concerned as to the productivity of the operation. At the same time it must maintain the quality specified.

"Economy" is the freedom from waste; the thrift and the regulation and control of quality, quantity, cleanliness and safety. Processing for economy should plan a careful spending of money not alone for the original installation, but for the tools, repairs and upkeep demanded to maintain both quality and quantity as well as safety and cleanliness.

Processing for "Cleanliness" and "Safety" should embrace all the factors which make good housekeeping. Everything on the job that is necessary and a place for everything and everything in its place. It should consider the methods to be used in removing the refuse caused by an operation and plan the elimination of all dangerous hazards.

In processing a cylinder block for the average automobile, we find many basic things to be considered:

Processing should first start when the design of the block is being made by the car engineer. While the design is still liquid, inject the fundamentals of foundry and machine practice which experience has taught to be best. Many times the car engineer has optional designs, any of which may be acceptable, and which do not affect the function, appearance or structural strength of the part. It is possible to influence this design if the question arises in the

early experimental design stages. Cost guidance must be available to the car engineer at every stage of this period of design. The process man should work with the car engineer and assist in the development of the design previous to and during the actual experimental design period.

Starting in the core room, cylinder block processing determines the development from the core sands to a finished core. Process should establish the proper vents in the cores for the escapement of the gases caused by the hot metal burning up core oil; the proper amount of draft for the cores; the extra metal allowed for machining purposes; and the use of any of various core sand mixtures made from either sharp sands or bank sands, or a mixture of both; the amount of core oil to be contained in each core; the proper drying out or baking time; the hardness of each core, its proper strength; rigidity; porosity; as well as accuracy to produce a casting which when machined will have the specified wall thicknesses.

The metal pouring line should be processed to enable the cores to be assembled into the cope and drag together with the moulding and facing sands, ready to receive the hot metal. This progressive line includes the cooling of the block and the removal of the cores and subsequent delivery to the cleaning operations for the pulling of core wires, sand-blasting to clean sand from the surface of the metal, and the removal of various fins making the casting ready for machining operations. The planning of these operations must be accurate and definite to secure the coordinated result.

Processing a cylinder block for the machining operations must determine many very important factors. Proper location of the block in the jigs to insure specified wall thicknesses is of great importance. Among other factors which determine the processes are: 1. Sequence of operations; 2. Machine investment for a given production; 3. Fixtures, tools and gages; 4. Heat dissipation; 5. Accuracy of each operation; 6. Loading height of machines; 7. Spacing of machines; 8. Conveyors; 9. Layout; 10. Men assignment; 11. Control of parts in process; 12. Repair of machines, tools and jigs; 13. Safety and cleanliness; 14. Importance of speeds and feeds; 15. Elimination of bottle necks in line. In processing a body door panel, the same fundamentals should be observed, although the procedure is entirely different. A contour model is furnished by the car engineer. From this model the process determines the draw die which produces quality within dimensional specifications.

The variables of design which directly affect scrap and excessive metal finishing are important phases of process study. Sharp corners, small radii, excessively pronounced beads, or embossments which stretch the metal beyond its physical limit, or act as locking beads obstructing the flow of the metal in the draw die operations should be studied with the car engineer. Extremely deep draw operations sometimes require metal of special physical characteristics to suit the conditions. Location of welded joints are of prime importance; their location many times simplifies the depth of the draw operation as well as the accessibility for metal finishing. These developments should be studied with the car engineer while the design is still liquid if the best results be secured.

Process is still charged with the responsibility of determining just how much the dies will disfigure or leave its fabrication marks on the panel, making necessary subsequent operations to remove them. Additional operations of this nature are very expensive. A good process should always pre-determine the amount of metal finishing required. A good many cases will show the necessity for better dies or a changed process to eliminate such excessive costs.

Other processes to be considered are: 1. Heat treat; 2. Painting and enameling; 3. Upholstering and trimming; 4. Electro plating; 5. Forging; 6. Body panel welding; 7. Body in white; 8. Chassis and final car assembly; 9. Past model and service parts; 10. Wood Mill; 11. Sewing Room. The procedures involved are different but the same fundamentals are still applied.

The functions of processing are interwoven with the functions of plant layout and time study to such an extent as to make distinction of these functions sometimes a matter of opinion rather than policy.

The primary work of the Layout Division is to plan the location of machines and equipment so that the sequence of operations on a process routing are followed with the greatest economy. To do this work satisfactorily, the layout man should have a thorough knowledge of the amount of time required to perform the operation in order that the machines may be grouped so that the men assignment may be utilized to the best advantage.

It is often possible to have one man operate two machines or two men operate five machines, but unless the layout man can visualize this condition, the saving that could be made by proper grouping would be lost. There are, however, many other things to think of before actual layouts can be made. The general plan of departmental location is the first consideration.

Departments that feed assembly lines must be placed so that their parts are finished as near as possible to the point of assembly. Aisles of proper width must be provided so that rough or finished materials, etc., may be moved without excessive costs. Tool cribs must be located where they will best serve the men who will use them most. In short, the layout should be such as to enable all of the personnel to perform their work in the most economical manner.

The process man should also have very close contact with the Time Study man and jointly develop the productivity of the operation.

The primary work of the time study division is to establish a standard of time for each operation as shown on the process routing, to make time and motion studies, and to determine if the fixed standards of quantity are being secured through actual performance.

At this point, process, layout, and time study must be knit together very closely to determine if each division has performed its assignment to the satisfaction of each other and to the production

(Continued on page 14.)

SOLID OF REVOLUTION METHOD

for

CALCULATING DIE BLANKS

By O. B. JONES*

Editor's Note: We have all experienced the disappointment that comes from being unable to find a formula to fit the job. Jobs have a nasty habit of not fitting formulas anyway. This is especially true of die designing jobs.

The author of this article outlines a procedure which makes it possible to calculate the diameter of blank for many drawn shapes for which formulas are not available. The article also illustrates a method for calculating the location of the center of gravity of areas, which will be found of value to the general designer.

FIG. 1

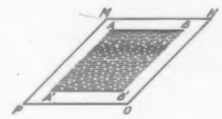


FIG. 2

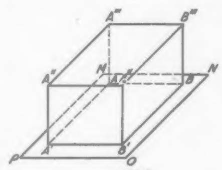


FIG. 3

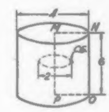


FIG. 4

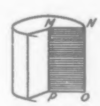


FIG. 5

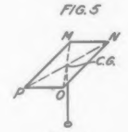


FIG. 6

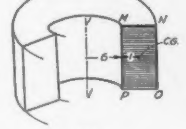


FIG. 7

FIG. 8

FIG. 9

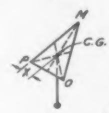


FIG. 10

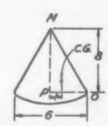


FIG. 11

In geometry a point is considered as having no magnitude,—no size. It is merely a location in space. If it is moved from one location to another as from A to B in Fig. 1 the path it travels is called a line. We say the point, in moving generates the line AB. If the line is the shortest distance between the position of the point before it is moved and its position afterward it is a straight line.

If the straight line AB in Fig. 2 is moved at right angles to itself from one position to another position in the same plane MNOP, parallel to its original position, it generates a plane surface ABB'A'. The area of the generated rectangular plane surface is the product obtained by multiplying the length of the generating line by the perpendicular distance it moves, that is the length of AB by the perpendicular distance from A to A'.

If the plane generated by the line is lifted perpendicularly from A to A''' in Fig. 3 the space it passes through is a rectangular prism. The volume of the rectangular prism generated by the rectangular plane surface is the product obtained by multiplying the area of the rectangular plane surface by the vertical distance it is lifted.

Thus, the point generates the line; the line generates the surface; and the surface generates the solid. This constitutes the three-dimensional realm of the practical mathematician.

In geometry, a solid is the space occupied by any object. The volume of a solid figure is always expressed in cubic units and is the number of cubic units of space occupied by the figure. If all the space occupied by the solid is traversed by a plane figure rotated or revolved about any axis, the solid is a solid of revolution.

The right circular cylinder shown in Fig. 4 is a solid of revolution, because all the space it occupies is traversed by the plane MNOP if it is rotated through 360° about M-P as an axis, as shown in Fig. 5.

The volume of a solid of revolution is the product obtained by multiplying the area of the rotating or revolving plane by the mean circumference of the solid. The mean circumference of the solid is the distance traversed by the center of gravity of the plane as it makes one revolution. The center of gravity of the rectangle MNOP in Fig. 6 is at C.G. The point C.G. is the location upon which the plane would balance horizontally if supported upon the point of a pin. The center of gravity of the rectangle is the point of intersection of its diagonals MO and NP.

To find the volume of the right circular cylinder shown in Fig. 4 we first determine the distance the center of gravity of the rotating plane MNOP is from the axis of rotation MP. MN is 2 units in length. The center of gravity of MNOP is therefore located one unit from the axis of rotation MP. The mean diameter is twice this radial distance, or 2. The mean circumference of the cylinder is 2 Pi. This is the distance the point C.P. travels in making one revolution. The area of the rotating plane is $2 \times 6 = 12$ square units. The volume V, of the cylinder is $V = 12 \times 2$ Pi $= 24$ Pi cubic units.

If the plane MNOP in Figs. 4 and 5 is revolved about the vertical axis VV in Fig. 7 located 6 units from, and parallel to, MP its radius of revolution is $6 + 1 = 7$. Its mean circumference is 14 Pi, and is volume, $V = 12 \times 14 = 168$ Pi cubic units.

The right circular cone in Fig. 8 may be assumed as having been created or generated by rotating the right triangle MOP in Fig 9 about its altitude Mp

*Mathematics Instructor, Detroit College of Applied Science.

LETTER FROM A MEMBER

DEPARTMENT OF DEFENCE
Small Arms Factory
Lithgow, New South Wales
Australia

24th October, 1935

The Tool Engineer
Detroit, Mich., U.S.A.
Gentlemen:

I am in receipt of your letter of 25th July, 1935, and will see what I can do in the near future toward complying with your request.

This factory was laid out by Mesrs Pratt & Whitney in 1912 and the plant duplicated in 1915 and again added to in 1921. As there are no comparable industries so far established in this country, we are peculiarly situated. Starting out from scratch we had a hard job training toolmakers and operators. During the world war, we had a maximum of 1700 employees, but at the present time we number 280. From 1921 to 1927 we tooled up for the Vickers Machine Gun, Land Pattern, and are now also producing the Air Pattern Gun, both Right Hand anad Left Hand. This was a big job as owing to the scarcity of skilled labour, we had to tool every component up to be done entirely by unskilled labour. However we were very succcessful. At the present time we have capacity to employ over 2,000 hands, including 250 toolmakers. We have about 3,000 machines installed to date, 90% of which were made in U. S. A. We manufacture all of our own tools, gauges, fixtures etc. with the exception of twist drills. Our product comprises Rifles and Machine Guns.

Some few years back we ventured out into commercial work and produced numbers of Talkie Machines, (mechanical part only) for the Western Electric Company, also large quantities of Sheep Shearing Machine parts. The venture was succcessful, but a change in government discontinued our activities.

We have been very helpful to many industries when starting up and also when they have encountered difficulties. Our shops are always open to manufacturers.

I notice by your Technical Journals that the Sosiete Genevoise have introduced their Thread Grinding Machine on your market. We can thoroughly recommend this machine as we have had one in operation since 1924 and since its introduction we have cut our screw gauge costs enormously. We find that we can grind our male screw gauge to within .0001 for diameter and for our female screw gauges, by grinding our taps and laps, we have no difficulties.

I am glad to see that The Tool Engineer is progressing so well and will conclude with best wishes from the other side of the world.

Yours truly,
Jack Finlay,
Assistant Manager.

(*Continued from page 12.*)

supervision and inspection who are charged with the responsibility of the actual performance.

Time Study will determine if the process and layout are satisfactory for an economical men assignment. If the operation is performed by a machine, time study will determine the correct speeds and feeds to be used in conjunction with the process man and production supervision.

The process man is always informed of the actual results being attained from his planning. He is in a position to further develop the weak spots to a point of elimination. His intimate knowledge of each operation increases and in so doing his processes improve, which results in better layouts and increased productivity with greater economy.

The process man should issue all orders for the replacement of such articles as tools, dies, patterns, bushings, hobs, broaches, etc., which are not considered commercial perishable tools. In so doing, he is informed of the expense required for upkeep, improving his knowledge, enabling him to develop or change such items as appear to be of excessive cost or usage.

The process man should be charged with the responsibility of creating new and changed methods to keep up with development of tools and machinery; for the reduction and elimination of waste; for developing better quality and for increased quantity.

Any automobile today is necessarily a compromise between the Engineering, Sales, Manufacturing and Accounting divisions. It is not a product of any one of these divisions but a product of all of them. And so it is with processing. The production supervision, inspection, layout and time study are as inseparable to process as these other departments are to the car engineer.

The results of process are: QUALITY—QUANTITY — ECONOMY — CLEANLINESS — SAFETY.

How does management measure these results? What yard stick is used? How definitely is responsibility tied up for having completed this assignment? If the Inspection Division is satisfied with quality, production supervision is securing quantity, and our product is being produced for our predetermined standards of economy, and we have eliminated the alibi between these divisions. Then, and only then, will the management feel the assignment has been completed. So far, no actual reference to the cost in dollar has been mentioned. If the assignment has been carried out successfully, the dollars will take care of themselves.

This, gentlemen, is the true relationship between processing and costs.

JANUARY MEETING

CLEVELAND

JANUARY 9th, 1936

HOTEL ALLERTON—BALL ROOM

Dinner: 6:30 p. m.

Technical Session: 8 p. m.

Speaker

Mr. Ferdinand Yehle

Research Engineer, White Motor Co.

It is anticipated that more than one hundred and fifty Tool Engineers of the Cleveland industrial district will attend this important first meeting of this chapter. All production executives are invited and are urged to make their reservations immediately for the dinner preceding the technical session. Dinner tickets are $1.25 each.

A.S.T.E. Chapter News

CLEVELAND

The second meeting of tool engineers in Cleveland interested in forming a chapter of the American Society of Tool Engineers went over the top. Twenty-seven charter applicants met at Hotel Hollenden on the evening of Dec. 3 and under the guidance of R. M. Lippard, A.S.T.E. president, and Ford R. Lamb, vice president, set up the chapter machinery and secured their charter.

R. A. FINTZ
Cleveland Chapter Chairman

FRANK JEFFS
Cleveland Chapter Treasurer

G. J. HAWKEY
Cleveland Chapter Secretary

This was the culmination of hard work on the part of enthusiastic workers led by Rudolph Fintz, plant layout engineer of the White Motor Co., who felt the desirability of a local chapter. Several meetings of the voluntary committee were held and a campaign to reach prospective members was undertaken. The first meeting of all concerned was held at Hotel Hollenden on October 18 and about forty attended. While there was not a sufficient membership application to qualify for a chapter at that time, an interesting discussion was held during which Ford R. Lamb, first vice president of A.S.T.E., outlined the birth and progress of the organization together with plans for the future. Chapter requisites were thoroughly explained and original workers, augmented by others, set to work immediately following the session to reach the desired goal.

The second big meeting in Cleveland was set for Dec. 3 at Hotel Hollenden with a qualifying membership assured.

R. M. Lippard, A.S.T.E. president, and Ford R. Lamb, first vice president, arrived from Detroit to assist and direct the group in chapter organization. Through their capable leadership, the many problems connected were easily leveled. Before any action was taken, Rudolph Fintz, chairman of the meeting, introduced the national officers who outlined the history, aims and policies of the Society, giving the prospective members a clear insight into the organization. This was followed by election of officers under the guidance of Mr. Lippard. Successful candidates were instructed and awarded the tools of office by Mr. Lamb.

Rudolph Fintz, plant layout engineer, White Motor Co., was chosen as the chapter's first chairman. George J. Hawkey, president of the Cleveland Duplex Machinery Co., was voted to the office of secretary. Frank Jeffs, engineer, the Cleveland Universal Jig Co., was named Treasurer.

Following the election, Mr. Lippard as acting chairman turned the gavel over to the regularly installed Cleveland chairman, Mr. Fintz, who conducted the meeting from this point. A vote of thanks was given both Lippard and Lamb for their efforts in effecting the chapter.

Chairman Fintz named Chas. Kotersall, Tool Engineer, the J. C. Ulmer Co., as head of the meetings committee; Paul Zerkle, proprietor, the Production Tool Sales Co., as head of the entertainment committee; Frank Jeffs, Engineer, the Cleveland Universal Jig Co., as head of the membership committee; Paul F. Rosbach, Chief Tool Engineer, the Eaton Axle Co., as head of the editorial committee; and Paul Shaw, president, the Positive Safety Mfg. Co., as head of the constitution and by-laws committee. Chairman of the industrial relations committee will be named at a later date. Committee heads and officers will collaborate on the appointment of other committee members.

A lengthy open forum discussion was held during which the duties of various committees and the financial structure of A.S.T.E. chapters were explained by Mr. Lippard. He also announced a probable dues increase the first of the year. Place and date of future meetings of the chapter as well as type of meetings was discussed. It was decided to hold Cleveland meetings on the second Thursday of each month. Plans are now being formulated for the first big meeting of the newly chartered group on January 9. With the entire tool engineering field well informed, it is expected that the first meeting will be a rousing affair and that a flood of new memberships will ensue.

Gratification was expressed by the national officers in attendance at the fine organization progress. Members were urged to put their shoulders to the wheel and make the Cleveland chapter an outstanding success. Mr. Lippard pledged support of the national organization.

(Continued on page 18.)

THIS MONTH'S COVER

THE USE OF CEMENTED CARBIDES ON NEW MACHINES

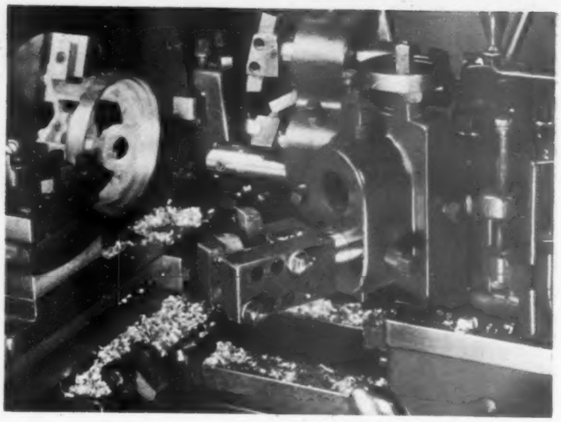
Typical of the many applications of cemented carbides on new machine tools is the set-up illustrated on the front cover. This particular application—turning and facing a cast iron part using a Jones & Lamson 8" V-Automatic—is one of several scores on demonstration at the recent Machine Tool Builder's Show which revealed the many advantages of using cemented carbides in conjunction with new machine tools.

Demonstrations employing Carboloy tools embodied a representative cross section of the many varied machines exhibited and covered practically all types of common machining operations. The materials machined included brass, bronze, cast iron and aluminum alloys. A wide variety of steels were machined with cemented carbide tools as well but it is to be pointed out that the cutting of steel with carbides is still in the experimental stages. Although a fair number of steel applications can be satisfactorily performed today with carbide tools and the proper machine tool, the use of carbides in the steel field cannot be considered in the same practical classification as the use of carbides on cast iron, non-ferrous metals and non-metallic materials.

Interesting to note is the fact that the major portion of the cemented carbide applications were production jobs running at practical speeds, feeds and cuts, rather than "stunt" demonstrations impossible of attainment in the average plant. Lest this be accepted as an indictment against the "demonstration" jobs at the show, it should be added that most of such cemented carbide demonstrations at the 1935 Show were well within the bounds of practical operation. Present day machine tools such as were demonstrated at this show are fully capable of employing cemented carbide tools to the extent of their economy. This is the first time that such a report could be made. It is destined to have a very profound effect upon the use of cemented carbides in future plant installations of new machines.

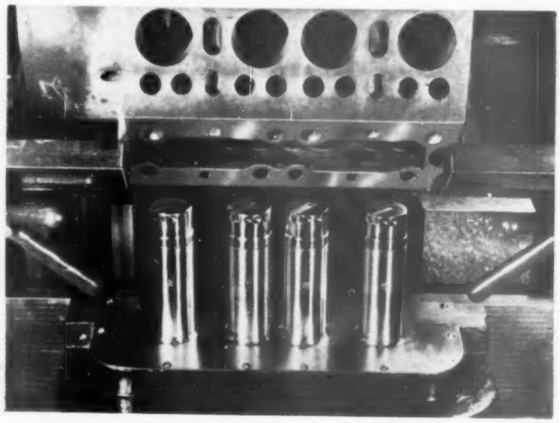
One of the outstanding improvements that have been made on practically all machine tools since the Machine Tool Congress in 1929 is the flexiblity and ease of handling embodied in the new machines. This, together with the greatly reduced cutting time possible with Carboloy tools, results in tool setup time becoming a factor steadily increasing importance. Here again carbide tools are of decided benefit due to their long life between grinds, eliminating much resetting time formerly necessary. That this fact was readily recognized by all machine tool builders was evident in the large number of applications tooled with cemented carbides.

The potential possibilities of machine tools exhibited when used with cemented carbide cutting tools brought forcefully to mind the fact that tremendous advancement has been made on the part of machine tool builders as well as cutting tool



Turning, facing, boring aluminum alloy aircraft parts on a Warner & Swasey No. 3 Turret Lathe using cemented carbide tools, Speed: 1150 F.P.M., Floor-to-floor: 2.5 min.

"Borizing" wrist pin holes in aluminum pistons using cemented carbide tools on a Heald No. 49 Borematic. Speed: 2000 R.P.M., Feed: 8" rough, 4" fin., Cut: .020" rough, .010" fin.



Precision Boring hard cast iron cylinder blocks on Ex-Cell-O Heavy Duty P.B. Machine. Tolerance .0003" maximum for round, straight and surface variations over a 6" length of cut.

ENGINEERED PRODUCTION

EXAMPLES FROM THE SUNDSTRAND FILES

No. 3601

Lathes
Milling Machines
Tool Grinders
Centering Machines
Balancing Tools

Automatic 10″ Stub Lathes Step Up Gear-Blank Production

Excellent on short-run work because it is easily set up, operated, and changed from one job to another; the Sundstrand Automatic 10″ Stub Lathe also has the strength, rigidity, and stamina to retain its high accuracy and productive capacity steadily on long-run work. For maximum production, this lathe lends itself readily to the application of special tooling and attachments. A good example of this is found in the Automatic 10″ Stub Lathes for rough- and finish-turning the forged steel gear-blanks shown in Fig. 1.

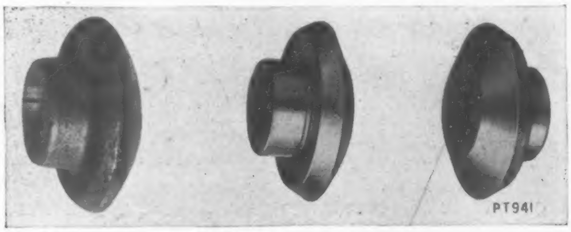


Fig. 1. Above. Shows gear-blank forging as it comes to Automatic 10″ Stub Lathe, and two views of a machined work piece.

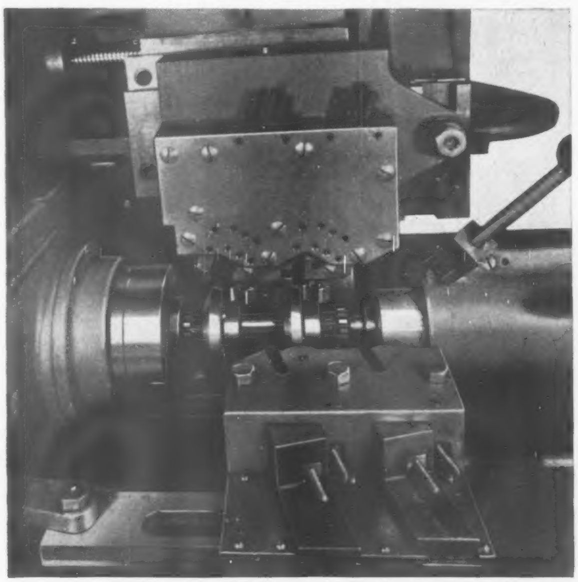


Fig. 2. A total of 20 tools cut simultaneously on two gear blanks.

These blanks come in several sizes; are rough-turned, two at a time, on one Automatic 10″ Stub Lathe; and finished in the same way, by the same operator, on a second 10″ Stub Lathe. Twenty high-speed tools cut simultaneously on each lathe. Four tools on the front slide turn hub diameters and back angles. Eight tools on the rear slide face, and form radii. Eight tools on the overhead auxiliary slide turn, chamfer, and undercut. Fig. 2 shows close-up of tooling, and mounting of two gear blanks on one arbor: Fig. 3 is a picture of the whole machine. Lathes are entirely automatic after starting so that operator can change

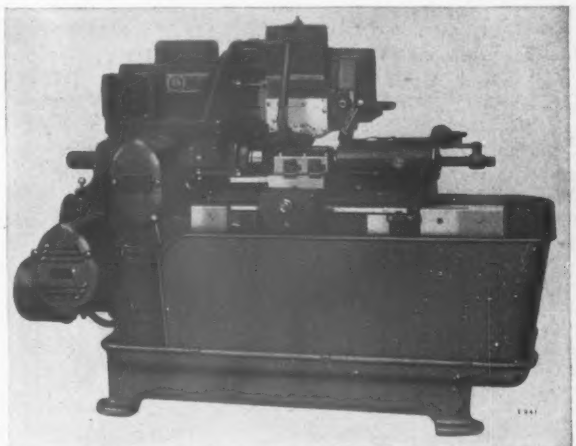


Fig. 3. Sundstrand Automatic 10″ Stub Lathe with overhead auxiliary slide and tooling for stepping up production of gear blanks.

work-pieces on extra arbors while machining is in progress. The automatic cycle, ability to operate multiple tooling effectively, high speed, and sustained accuracy of these Automatic 10″ Stub Lathes are features which step up production on this work.

Investigate Sundstrand Automatic 10″ Stub Lathes. Write for descriptive literature and see how the features and advantages of these reasonably priced machines can cut costs and increase production on a wide variety of lathe work.

SUNDSTRAND MACHINE TOOL CO.

2530 Eleventh Street, ROCKFORD, ILLINOIS, U. S. A.

(Continued from page 15)

RACINE

The first open dinner meeting of the Racine Chapter of A.S.T.E. was a big success. More than one hundred Tool Engineers of the area and their guests attended the meeting which was held December 3rd. The main speaker of the evening was A. H. d'Arcambal of the Pratt & Whitney Co., who spoke on "A Practical Talk on the Machineability of Metals." In connection with his talk, Mr. d'Arcambal had an excellent display of recently developed tools. The discussion after Mr. d'Arcambal's talk proved, also, to be of great interest. The photograph shows a part of the group who attended this meeting. In the foreground, front row, may be seen Mr. Elwood, Racine Chapter Secretary, Mr. d'Arcambal, speaker, Mr. Hiatt, Racine Chapter Chairman, Mr. Falkenrath, Racine Chapter Treasurer and at the extreme right of the front row Mr. Eugene Bouton who sponsored this chapter of A.S.T.E.

THIS MONTHS' COVER

(Continued from page 16.)

manufacturers. The ability of industry to produce rapidly, accurately and with a lower overall investment will be assured when new machine tools coupled with cenemted carbide cutting tools are used more extensively. This is destined to come about as old machine tools are replaced with new ones.

CALCULATING DIE BLANKS

(Continued from page 13.)

as an axis. The perpendicular or radial distance X, in Fig. 10 of the center of gravity of the triangle MOP from its altitude MP is equal to one third of its base OP, or $X = \frac{OP}{3}$.

To find the volume of the right circular cone in Fig. 11, we first determine the distance the center of gravity of the rotating plane triangle MOP is from the axis of rotation MP. The base OP of the triangle MOP is 3 units long. The center of gravity, C.G., of the triangle MOP is $\frac{1}{3} \times 3 = 1$ unit from MP. This is the dimension X shown in Fig. 10. The mean diameter of the cone is twice this radial distance, or 2. The mean circumference of the cone is 2 Pi. The area of the rotating plane is $3 \times 4 = 12$ square units. The volume V of the cone is, $V = 12 \times 2\text{ Pi} = 24\text{ Pi}$ cubic units.

(To be Continued)

McCrosky Boring Blocks and Bars

with Centralizing V Lock

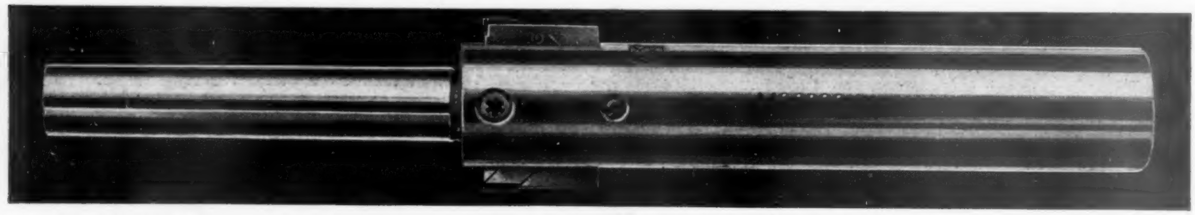
McCrosky's new and improved design of centering key locates and locks the cutter block in the boring bar with extreme accuracy. A square centering key with a tapered V centralizes the block by engaging a complementary V slot in the front of the block. The McCrosky design is readily adaptable to bars specially designed for unusual jobs . . . Send for bulletin showing standard blocks and bars and examples of special applications.

- **McCrosky Blocks made in 5 basic sizes with wide range of cutting diameters**
- **Hardened to resit wear and damage**
- **Can be inserted or removed from bar without disturbing centering key**
- **Large and economical blade adjustment.**
- **Cutting thrust taken by separate hardened thrust block behind cutter block**

McCrosky Tool Corporation

1360 Main St., Meadville, Pa.

Sales Offices in Detroit, Cleveland, Chicago, Philadelphia. Agencies in all principal cities



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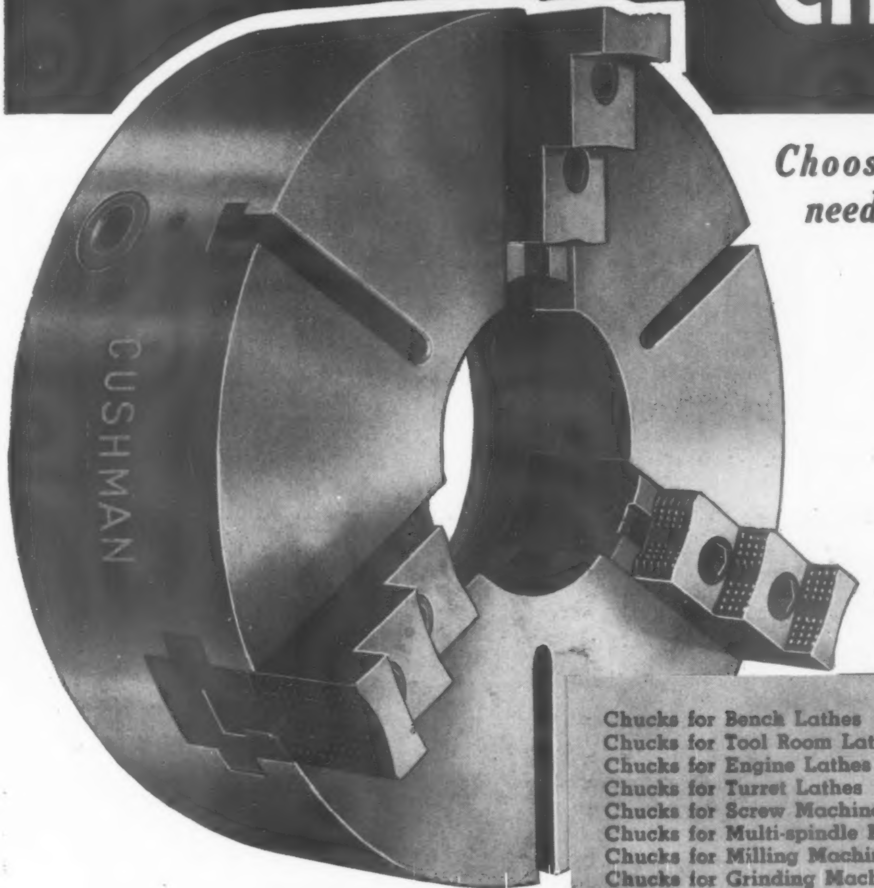

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Chucks for Engine Lathes
Chucks for Turret Lathes
Chucks for Screw Machines
Chucks for Multi-spindle Machines
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Chucks that are both Self Centering and Independent
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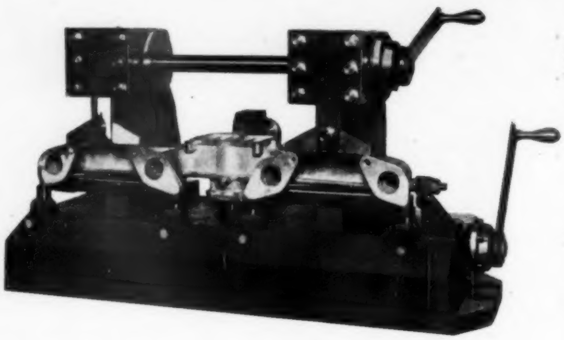

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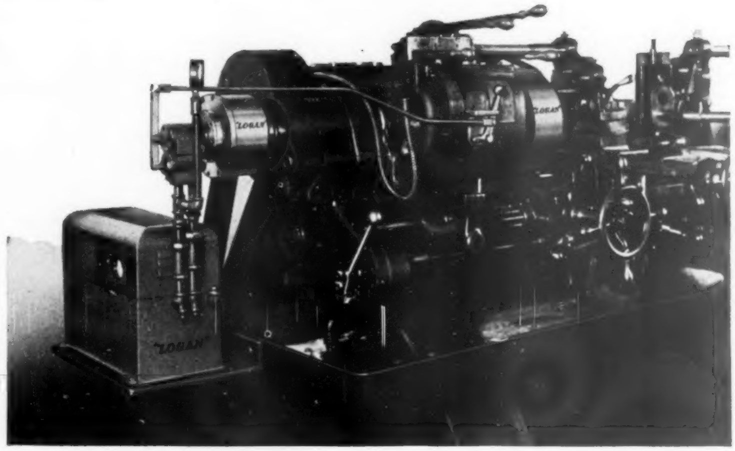

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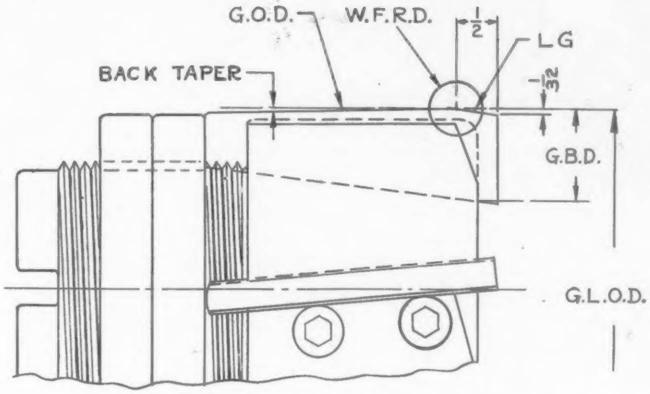

A typical grind is shown which meets the great majority of cases for accuracy and finish.

W. F. R. D. = **Where finishing reamer dulls:**

G. L. O. D. = **Grinding life on diameter = .250″ on 2″ Reamer.***

L. G. = **Lead grind = 125 Grinds on 2″ Reamer.**

G. O. D. = **Grinds on diameter = 62 Grinds on 2″ Reamer.**

G. B. D. = **Greatest blade depth (Blade has greatest support where actual cutting is done.)**

These figures are based on grinding twice on the lead, removing .015 stock per grind, to each grind on the O.D. removing .004 per grind.

***This varies with the size of the reamer, the standard 6″ size having ⅝″ grinding life on diameter.**

The construction of

G&G

Serrated Blade Cam Lock Reamers

is such that the blade length does not change throughout its life and therefore it is never necessary to "cut off" the blades because they extend too far beyond the body.

For full particulars write for Catalog "D."

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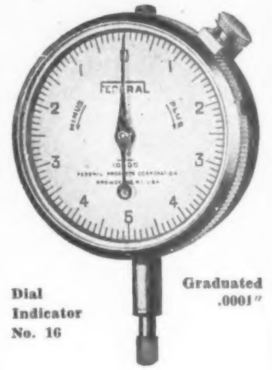

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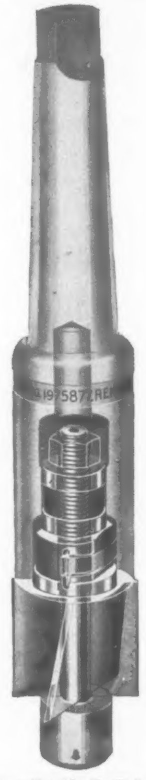

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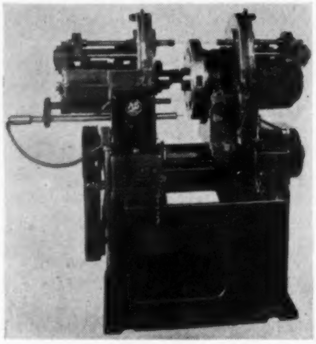

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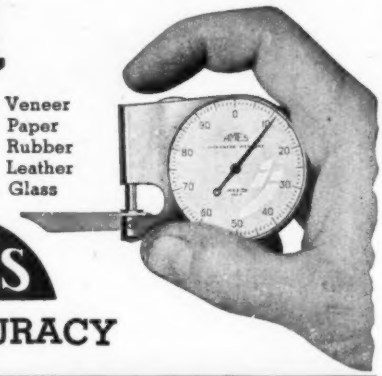

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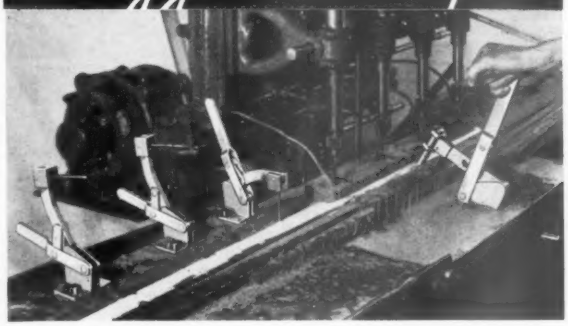

DE-STA-CO Toggle Clamps shown at left are used as index gauge to locate work, and clamp at right holds steel bar in position during drill machine operations. These clamps are a dependable device that hold production articles, such as metal parts, stampings, castings, forgings and similar pieces in a jig or fixture during subsequent operations.

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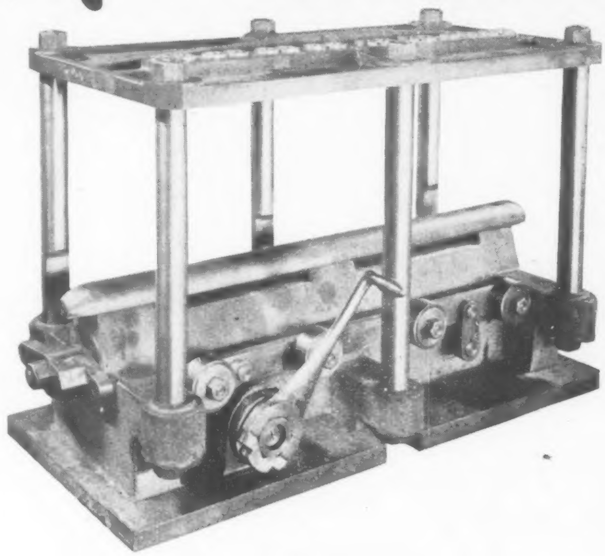

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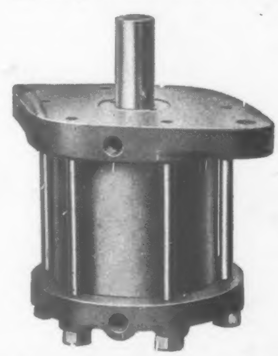

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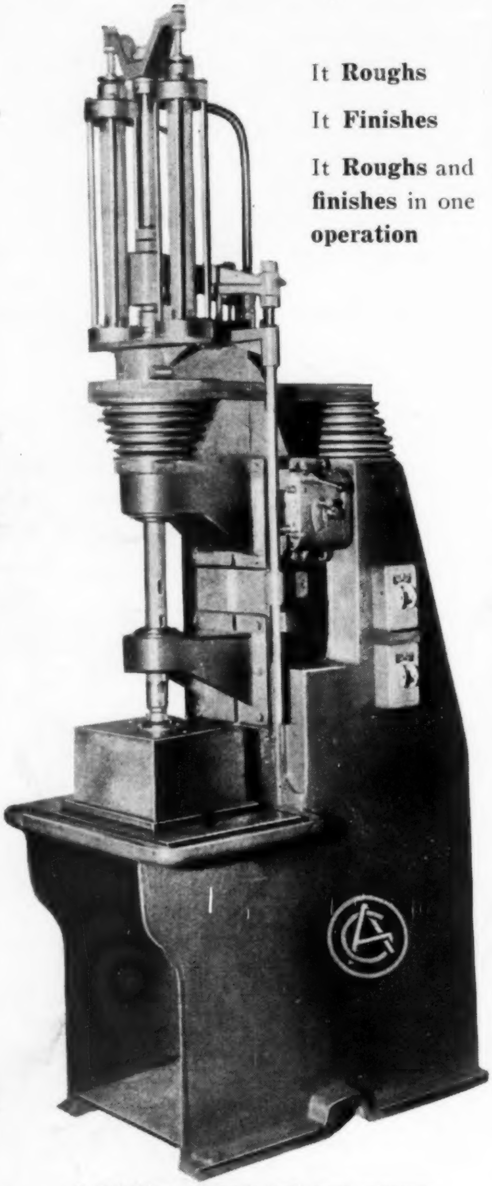

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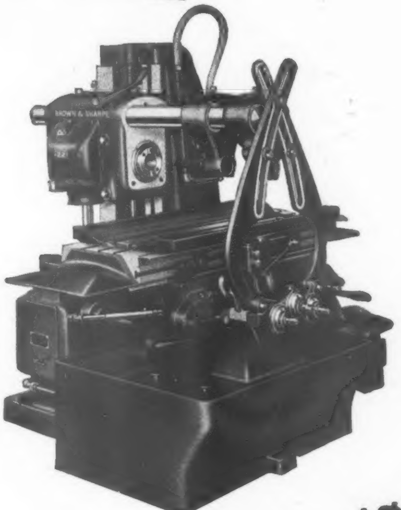

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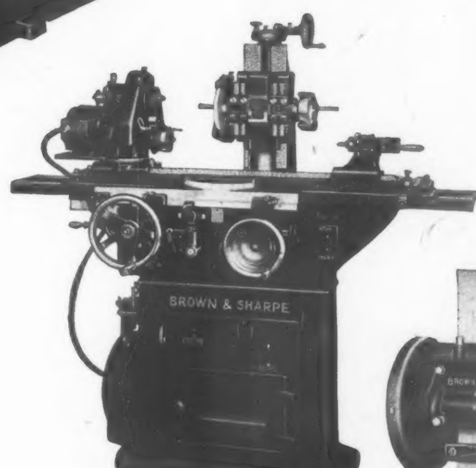

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